SOME EOCENE INSECTS OF THE FAMILY FULGORIDAE

By T. D. A. Cockerell and Grace Sandhouse,
Of the University of Colorado, Boulder.

The remarkable abundance and variety of the Homopterous family Fulgoridae in the Rocky Mountain Eocene has already been commented upon. Many of the species were broad-winged insects resembling moths, such as exist to-day in the oriental region. To the already long list we add three more, one a new generic type. We also find an additional example of *Detyopsis packardi* Cockerell from Roan Mountain, Colorado (U. S. G. S., 180), which is here figured as plate 98, fig. 1.

HAMMAPTERYX TRIPUNCTATA, new species.

Plate 98, fig. 3.

Tegmen 14.3 mm. long as preserved, the total length probably about 15.5 mm.; greatest width about 7.3 mm.; general appearance, with broad, gently rounded outer margin, as in the other species. The tegmen is pallid, suffused with fuscous on the upper third (the veins here appearing light on a dusky ground), and there are three conspicuous dark fuscous (probably black in life) spots. The outermost and largest of these is irregularly subcrescentic, somewhat over 1 mm. long, placed 2 mm. below the costal margin and about 4 mm. from apex of tegmen. The innermost spot is small and subtriangular, placed 11.6 mm. from apex and 2.3 mm. from costa. The third spot, which is a broad vertical bar about 1.2 mm. long, is 4 mm. from costa and 9 mm. from apex. The costal area in middle is about 1.2 mm. wide, and its oblique cross veins are about 7 in 2 mm.

U. S. G. S. 217 and (reverse) 211. Roan Mountain, Colorado, in rocks of Green River age. From the Scudder collection.

Holotype.—Cat. No. 67717, U.S.N.M.

This is larger than *H. ceryniiformis* Cockerell and *H. reticulata* Scudder, but somewhat smaller than *H. lapidoides* Cockerell. From all of these it is readily distinguished by the form and arrangement of the spots. The general appearance suggests the living *Hilavrita trimaculata* Distant, from Ceylon, but that is much smaller and has the spots differently placed.

LITHOPSIS DUBIOSA, new species.

Plate 98, figs. 4, 5.

Tegmen 9 mm. long and 3.7 wide; costa very strongly arched and elevated basally, beyond that straight, even a little concave; costal area in middle about 1 mm. wide, with about five cross veins in 1 mm.; veins fuscous, and costal and apical areas suffused with fuscous. The radius branches 1 mm. from base of tegmen. Media branching about 3.3 mm. from base, each of these branches again dividing, the upper about 6 mm. and the lower about 6.5 mm. from base of tegmen. Cubitus branching about 5.3 mm. from base. The anal veins in the claval area unite about 4.5 mm. from base of tegmen, inclosing a pointed cell, the base of which is strongly curved upward.

U. S. G. S. 105 and (reverse) 106. Roan Mountain, Colorado (Scudder). U. S. G. S. 123 and (reverse) 129, from the same locality, seems to be the same species.

Holotype.—Cat. No. 67718, U.S.N.M.

In its general characters this closely resembles the living *Corethrura fuscovaria* Hope, from the Oriental region (Burma, etc.). Compared with the fossil *L. simillima* Cockerell, this differs by the subcosta, terminating about 4 mm. from base, radius branching nearer base, and in the details of the media. The apex of the tegmen is distinctly more produced. It is also distinct from *L. fimbriata* Scudder by the narrow costal area and other characters. We were in some doubt whether to consider this a variety of *L. simillima*, but there is so much difference in the venation that we can only treat it as distinct.

Scudder, in his account of *Lithopsis*, states that the two anal veins in the clavus are distinctly separated throughout. As this seemed improbable, and disagreed with our species assigned to that genus, we asked Dr. N. Banks to examine Scudder's types in the Museum of Comparative Zoology. He reports:

> I have examined the specimens of *Lithopsis*, and can not be sure about termination of the anal veins. In one (probably basis of fig. 36) the first anal appears to run as he shows it beyond where the second anal ends, but I can not trace it to the end, nor see where it ends in the marginal vein, although I think I can make out ending of the second anal plainly. In other specimen the anals look as if more approaching each other, but can not make out ending of either. In one (probably basis of fig. 36) it looks as if marginal vein was forked, so there is probably part of another wing under it. If there is part of wing under the elytron, then what appears as continuation of the first anal may be a vein from this underlying wing.

THAUMASTOCLADIUS, new genus.

Tegmen of moderate size, the costa straight beyond the basal third; costal region broad, with numerous oblique cross veins; radius apparently simple, only branching apically; media and first cubitus united to near middle of tegmen, then forking, the lower or cubital division

forking again toward apex; sutural vein (second cubital of Tillyard) forking no great distance beyond the union of the anals; second anal (Tillyard) running parallel with margin and close to it, the first anal having a double curve and joining it not much before middle of tegmen; lower margin strongly angulate subbasally.

Type.—Thaumastocladius simplex, new species.

THAUMASTOCLADIUS SIMPLEX, new species.

Plate 98, fig. 2.

Represented by a tegmen lacking part of base and apex, the length as preserved 8 mm.; probable total length, 9 mm.; width in middle, 3.3 mm.; veins fuscous. Mediocubital fork about 1.2 mm. anterior to fork of sutural, the latter about 5 mm. from base of tegmen; junction of anals about 4 mm. from base; costal area about 1 mm. wide.

U. S. G. S. 774. Green River shales, Green River, Wyoming.

Holotype.—Cat. No. 67719, U.S.N.M.

This is evidently a Fulgorid, but the combination of a broad costal area with simplified discal veins and a definitely forked sutural excludes it from any genus known to us. There is, however, a close general resemblance to the oriental genera *Gaja* Distant and *Bochara* Distant. In *Fulgora maculata* Olivier, from Ceylon, the sutural vein may fork a short distance before the apex, or may be simple.

DESCRIPTION OF PLATE 98.

FIG. 1. *Detyopsis packardi* Cockerell. ×4.
2. *Thaumastocladius simplex*, new species. Type, ×4.
3. *Hammapteryx tripunctata*, new species. Type ×4.
4. *Lithopsis dubiosa*, new species. Reverse of type, ×4.
5. *Lithopsis dubiosa*, new species. Type, ×5.